

# ROLLER MASSAGE: SURVEY OF PHYSICAL THERAPY PROFESSIONALS AND A COMMENTARY ON CLINICAL STANDARDS- PART II

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## ABSTRACT

**Background:** Roller massage (RM) has become a popular intervention prescribed by physical therapy (PT) professionals. While this popularity has stimulated an increase in research and product development, the trends in the use of RM among PT professionals remain undocumented. It is unknown how professionals are using RM and integrating the research into their clinical practice.

**Purpose:** To survey and document responses in the knowledge, clinical application methods, and use of RM devices among PT professionals in the United States.

**Design:** Cross-sectional survey study

**Methods:** A 20-question online survey related to personal and professional demographics, beliefs about RM, preferred RM devices, RM exercise prescription, and client education was emailed to PT members of the Orthopedic and Sports Physical Therapy Sections.

**Results:** A total of 685 sports and orthopedic PT professionals completed the survey. Most professionals surveyed believe that RM decreases pain (80%), increases mobility (68%), and increases range of motion (ROM) (40%). Fifty-one percent believed moderate density rollers have the greatest effect. Eighty percent of professionals use a foam roller in their practice and 51% recommend to clients. A high proportion of professionals prescribe RM for injury treatment (82%) and for pre and post-exercise interventions (55%). Most professionals recommend rolling daily for 30 seconds to two minutes (55%), per muscle group (64%), at a self-paced cadence (47%). A high proportion of professionals use patient reported outcomes (80%), followed by joint ROM (59%), and movement-based testing (42%) to measure effects of RM. Eighty-seven percent of professionals use live instruction to educate clients and 91% believe there is a gap in the research.

**Conclusion:** The results of this survey should be considered descriptive and a starting point for future research to establish a consensus on optimal RM programming, devices, and application parameters for different musculoskeletal conditions. The observed responses provide some insight into how PT professionals are using RM in their practice and highlight the existing gap between the research and professional practice. Further research is needed to explore the responses documented in this study.

**Key Words:** Foam rolling, massage, muscle soreness, myofascial, perceived pain, self-recovery

**Level of Evidence:** 3

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## INTRODUCTION

The use of roller massage (RM) also often called “self-myofascial release” (SMR) has become a popular intervention prescribed to clients by physical therapy (PT) professionals. RM has also become popular in many clinical and fitness settings.<sup>1,2</sup> This popularity has also prompted manufacturers to create various types of RM devices that can be found in many clinical, fitness, and retail settings. This popularity has also stimulated an increase in RM research; however, evidence is still emerging. Currently, there is no consensus on the optimal RM program and parameters such as cadence, technique, amount of force, and type of rolling device for different musculoskeletal conditions.<sup>3-6</sup> This gap has driven PT professionals and clients to use their own preferred methods of RM due to the lack of scientific guidelines.

The trends in the use of RM among PT professionals remain undocumented. A recent literature search (May 2018) of electronic databases including: PubMed, PEDro, Science Direct, and the EBSCOhost collection revealed no publications documenting such clinical trends. Understanding the current trends in the use of RM devices among PT professionals may help further guide researchers in developing scientific guidelines for application of RM with clients. The purpose of this study was to survey and document responses in the use of RM among PT professionals. This study was considered descriptive and a starting point for future research analyzing such topics.

## METHODS

### Participants

PT professional members of the Orthopedic and Sports Physical Therapy Sections of the American Physical Therapy Association (APTA) (N=22,409) were sent an online survey between the months of April to August 2017. Six hundred and eighty-five participants completed the survey. This descriptive survey study was approved by the California State University Dominguez Hills Institutional Review Board (17-202)

### Survey Design

The online survey administered via the Survey Monkey platform (SurveyMonkey®, www.surveymonkey.

com) included 20 questions that represented three distinct areas: 1) survey participant demographics 2) preferred RM devices, 3) RM prescription, client assessment, and education. For demographics, the goal was to document age, credentials, practice setting, and years in practice. For RM devices and RM prescription, the goal was to document the preferred RM devices respondents use and how they prescribed the intervention to their clients. The survey asked such questions as common devices used, rationale behind exercise prescription, prescribed cadence, and total time of the intervention. For education, the goal was to document the types of client education conducted by PT professionals and if they referred the client to a specific resource to purchase such devices. Appendix A provides the survey questions.

Once survey development was completed, the survey underwent two rounds of pilot testing with 10 independent PT professionals to establish face validity. Based upon the feedback, revisions were made, and a final survey version was confirmed. The final survey was further tested for readability using the Flesch Ease of Reading Test and Flesch-Kincaid Grade level test. The survey's 20 questions scored 81.0 on the Flesch Ease of Reading Test and 4<sup>th</sup> grade on the Flesch-Kincaid Grade level test which indicated the English used in the survey was fairly easy.<sup>7</sup>

### Data Analysis

Statistical analysis was performed using SPSS version 24.0 (IBM SPSS, Armonk, NY, USA). Descriptive data including response frequencies and percentages were calculated and reported for the 20 questions.

## RESULTS

A total of 685 PT professionals (Sports Section: 193/6,721) (Orthopedic Section: 492/15,688) completed the survey which represented a 3.1% response rate. The following sections discuss the findings from the survey. It is important to note that some survey questions allowed participants to choose more than one answer. Tables 1-3 provide detailed results.

### Participant Demographics and Beliefs

Forty-eight percent (n=327) of respondents were men and 52% (n=358) were women. All respondents

**Table 1.** *Respondent professional demographics and beliefs about roller massage.*

	Frequency % (N)
Gender	
Male	47.74% (327)
Female	52.26% (358)
*Credentials	
Physical Therapist	100% (685)
Chiropractor	.001% (1)
Certified Athletic Trainer	9.63% (66)
Fitness Professional	0.99% (29)
MD, DPM, DO	.003% (2)
Other certifications and degrees	8.61% (59)
*Primary practice setting	
Outpatient clinic	87.73% (601)
Hospital based clinic	16.79% (115)
University sports medicine or athletic training facility	3.21% (22)
High school athletic training facility	.006% (4)
Fitness or wellness facility	1.75% (12)
Other setting (e.g. home, outdoors)	7.73% (53)
Years in practice	
Average years in professional practice	12 years (685)
*Immediate and lasting changes (> 2 weeks) seen with RM	
Increased joint range of motion	40.14% (275)
Increased mobility	68.17% (467)
Decreased pain	80.30% (550)
No changes	6.71% (46)
Type of roller density believed to have greatest effect	
Hard density	30.80% (211)
Moderate density	50.51% (346)
Soft density	5.41% (37)
Other types of roller densities	13.28% (91)
Belief there is a gap in the current RM literature	
Yes	91.39% (626)
No	8.61% (59)
* Respondents chose all options that applied to them; RM: roller massage	

**Table 2.** *Respondent preferences regarding roller massage devices.*

	Frequency % (N)
*Type of device used most often in practice	
Foam roller	80.00% (548)
Roller massage stick	44.67% (306)
Massage ball	51.97% (356)
Other devices	31.82% (218)
*Type of roller most often recommended to clients	
Foam roller	79.27% (543)
Roller massage stick	46.00% (315)
Massage ball	62.63% (429)
Other devices	21.75% (149)
Preferred length of roller to use with clients	
Half size (13-15 inches)	18.39% (126)
Full size (26-36 inches)	50.51% (346)
Both sizes	19.85% (136)
I don't recommend	11.25% (77)
*Recommended places for clients to purchase devices	
Manufacturer website	25.69% (176)
Generic website	80.58% (552)
Store (brick and mortar)	41.31% (283)
Medical clinic or business	23.06% (158)
Other	1.00% (69)
*Respondents chose all options that applied to them	

**Table 3.** Respondent beliefs regarding exercise prescription, client education, and assessment.

*Reasons for choosing RM as an intervention for their clients	Frequency % (N)
Performance enhancement	31.39% (215)
Injury prevention	40.73% (279)
Treatment of injury	82.04% (562)
Pre-exercise warm-up and post-exercise treatment	55.18% (378)
Time prescribed for a pre or post-exercise session (per muscle group)	
30 seconds or less	6.57% (45)
30 seconds to 1 minute	26.42% (181)
1 to 2 minutes	37.51% (257)
2 to 3 minutes	18.98% (130)
No, I don't prescribe	10.52% (72)
Total time prescribed for pre or post-exercise session	
3 to 5 minutes	35.92% (246)
5 to 10 minutes	37.51% (257)
10 to 15 minutes	10.08% (69)
15 to 20 minutes	5.25 % (36)
No, I don't prescribe	11.24%(77)
Average cadence (speed) recommended when using an RM device	
1 to 2 seconds	4.96% (34)
2 to 5 seconds	16.35% (112)
Self-paced cadence	47.45% (325)
No cadence taught	20.29% (139)
Other techniques	10.95% (75)
Progression of clients through different roller densities (e.g. soft to hard)	
Always	3.79% (26)
Sometimes	44.68% (306)
Never	51.53% (353)
*Clinical measures used to assess effects of RM	
Joint range of motion	58.97% (404)
Pressure pain threshold	16.93% (116)
Patient reported outcomes (e.g. pain scale)	80.14% (549)
Movement based testing (e.g. FMS™)	42.48% (291)
No, I don't measure	7.44% (51)
Recommended frequency for clients to use RM devices	
Daily	55.62% (381)
Weekly	24.63% (168)
Monthly	19.84% (136)
*Common modes of educating clients about RM	
Live instruction	86.57% (593)
Video instruction	9.63% (66)
Self-guided program	21.17% (145)
Education materials (e.g. handout)	34.16% (234)
*Respondents chose all options that applied to them; RM: roller massage	

reported being PT professionals and 19% reported having other credentials. A high proportion of respondents reported working in an outpatient clinic (88%, n=601). The reported average years in practice was 12 years. Regarding immediate and lasting changes (>2 weeks), 80% (n=550) believe that RM decreases pain, 68% (n=467) believe that RM increases mobility, and 40% (n=275) believe that RM increases joint range of motion (ROM). Additionally, 7% believe RM doesn't produce any changes. Most respondents believed a moderate density roller (51%, n=346) has the greatest effect

on the myofascial system, followed by hard density (31%, n=211), and soft density (6%, n=37) rollers. Regarding research, 91% (n=626) believe there is a gap in the current RM research and further investigation is needed. See Table 1 for a detailed summary of these results.

### ***Preferred Devices***

Regarding delivery of RM, 80% (n=548) of respondents use a foam roller, 52% (n=356) use a massage ball, and 45% (n=306) use a roller massage stick in their practice. Respondents recommend either the

full-size foam roller (51%, n = 346) or both the full size (36" long, 6" diameter) and half size (18" long, 6" diameter) roller (20%, n = 136) to their clients. A high proportion of respondents refer their clients to generic websites (e.g. Amazon) (81%, n = 552) or manufacturer websites (26%, n = 176) to purchase RM devices. See Table 2 for a detailed summary of these results.

### ***RM Prescription, Client Education, and Assessment***

Most respondents prescribe RM for injury treatment (82%, n = 562), pre-exercise warm-up and post-exercise treatment (55%, n = 378), and injury prevention (41%, n = 279). Fifty-five percent (n = 381) of respondents recommend their clients roll daily followed by weekly (25%, n = 168). A high proportion of respondents recommend for clients to roll one to two minutes (38%, n = 257) or 30 seconds to one minute (26%, n = 181) per muscle group. Most respondents either recommend a total rolling time of three to five minutes (36%, n = 246) or five to 10 minutes (38%, n = 257). Forty-seven percent (n = 325) of respondents recommend a self-paced cadence and 20% (n = 139) recommend no cadence. Forty-five percent (n = 306) of respondents reported that they "sometimes" progress their clients through the different densities and 52% (n = 353) report never progressing clients.

A high proportion of respondents use patient reported outcomes (80%, n = 549) followed by joint ROM (59%, n = 404) and movement-based testing (e.g. the FMS™) (42% n = 291) to measure the effects of RM with their clients. Respondents also prefer to use live instruction (87%, n = 593) as the primary means of education. See Table 3 for a detailed summary of these results.

## **DISCUSSION**

This descriptive survey study was the first investigation to document responses regarding the use of RM among PT professionals. Several important aspects of RM use emerged from the survey.

*For demographics and beliefs*, most PT professionals believe that RM decreases pain (80%) and increase mobility (68%) immediately post-intervention and lasts greater than two weeks. The research suggests

that RM produces post-intervention increases in joint ROM in the lumbopelvic region,<sup>8,9</sup> hip,<sup>10-16</sup> knee,<sup>16-20</sup> ankle/foot,<sup>21,22</sup> and shoulder joint.<sup>23,24</sup> RM has also been shown to increase pressure pain threshold (PPT),<sup>18,25-27</sup> decrease evoked pain,<sup>28</sup> reduce spinal excitability,<sup>29</sup> and reduce the effects of delayed onset muscle soreness (DOMS) in healthy individuals.<sup>3-5,30,31</sup> Researchers have also found that RM to the agonist muscle may modulate muscle activity and PPT in the ipsilateral antagonist and the contralateral agonist through a crossover effect.<sup>21,27,32-34</sup> Despite these findings, there are some researchers that have failed to find any significant RM post-intervention results in flexibility, joint ROM, and balance in healthy individuals.<sup>16,35,36</sup> This must be considered when interpreting these studies for clinical practice. It is also important to note that the long-term effects of RM have yet to be determined. To the authors' knowledge, the longest documented RM post-intervention follow-up has been three days;<sup>4</sup> therefore, research on the long-term effects of RM is needed. More than half (51%) of PT professionals believe a medium density roller provided the greatest benefit. Several investigations have reported that the myofascial system may respond in a similar manner to low, moderate, and high RM pressure.<sup>25,29,37</sup> Results of recent research indicate that different roller densities (soft, moderate, hard) may produce the same post-intervention effects on joint ROM and PPT.<sup>38</sup> The majority of respondents (91%) believe there is a gap in the RM research which should encourage researchers to conduct more translational investigations to help bridge the gap between clinical practice and research.

*For preferred devices*, most respondents (80%) choose to use the full-size foam roller followed by a massage ball (52%) and roller massage stick (45%) with clients. There is evidence that supports the idea that a multilevel surface foam roller may have a greater effect than a smooth surface roller on the myofascial tissues<sup>39</sup> and that the human body may respond in a similar manner to all types of foam roller densities.<sup>38</sup> Furthermore, research suggests that the vibrating foam roller may have a greater effect on joint range of motion, flexibility, neuromodulation, and muscle performance than non-vibrating rollers.<sup>18,40,41</sup> There is also evidence supporting the efficacy of other



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devices such as roller massage sticks and roller balls as myofascial interventions.<sup>3,4,9,25,28,42-45</sup> However, there are some researchers that have shown insignificant effects of RM on joint ROM, flexibility, balance, and local muscle temperature.<sup>16,35</sup> Despite these findings the majority of evidence supports the idea of having a variety of RM tools available to provide clients with options. Further research is needed to investigate which devices clients are more likely to use in their home-care programs.

For *exercise prescription, client education, and assessment*, most respondents prefer to use RM for injury treatment (82%) followed by injury prevention (41%). To date, there are few studies that have measured the effects of RM in individuals with a diagnosed musculoskeletal pathology or the influence RM has on injury prevention. There is some evidence that suggests RM may have a positive impact on pain, joint ROM, and quality of life for individuals with fibromyalgia<sup>46</sup> and myofascial pain syndrome.<sup>47</sup> Fifty-five percent of the respondents reported using RM pre and post-exercise and recommend that clients roll daily. The highest recommended rolling time for each muscle group ranged between 30 seconds to two minutes (64%) at a self-paced cadence (47%). Currently, there is no consensus on the optimal time parameters for RM.<sup>3,4</sup> Researchers have investigated rolling durations of less than 30 seconds,<sup>9,20,42</sup> 30 seconds,<sup>21,25,28,29,48-50</sup> 45 seconds,<sup>34,51</sup> 60 seconds,<sup>11,13-16,31,35,52-55</sup> 90 seconds,<sup>53</sup> 120 seconds,<sup>8,17,18,27,32,53,54,56,57</sup> greater than 120 seconds,<sup>30,33,58-63</sup> and using predetermined repetitions,<sup>64</sup> The rolling times reported by respondents seem to be consistent with the majority of RM studies which suggests they are following the current RM evidence for rolling time. Respondents sometimes (47%) progress clients through the different densities but the majority (52%) never progress their clients. Common assessment tools used for RM included patient related outcomes (80%), joint ROM (59%), and movement-based testing (42%). These reported measures are consistent with research that has used movement based tests, such as the FMS™, to measure the effects of RM.<sup>54</sup> Respondents also reported using live instruction (87%) as the preferred method for client education. One investigation<sup>17</sup> measured the effects of teaching a short bout of RM using live

instruction, video, and a self-preferred program. Interestingly, no differences were seen between the three teaching methods. Cheatham et al<sup>17</sup> concluded that perhaps a prescriptive live instruction would be best initially followed by a supportive video or self-guided program.

### Limitations

Several limitations need to be discussed for this investigation. First, this survey was sent to a sample of PT professionals, who predominantly practiced in an outpatient setting with a 3.1% response rate. A larger sample with a higher response rate may have produced different results. Second, these results can only be generalized to PT professionals. Other allied health and fitness professionals who also use RM may have provided different responses. Third, the survey asked specific questions with discrete answer choices. Different questions or array of responses may have revealed different ideas of how PT professionals use RM devices. The respondents may have interpreted questions differently which influenced their answers. Third, this survey was sent to members of the APTA Orthopedic and Sports sections members. These results may not fully represent the perceptions and practices from other non-member PT professionals or members from other sections. However, the results do provide some insight into responses among PT professionals.

### Practice Implications and Future Research

The results of this survey should be considered descriptive in nature. The respondent beliefs documented highlight several clinical practices in the physical therapy industry that warrant further investigation. There seems to be a consensus that an increase in the RM research is needed to move towards determining the optimal RM intervention program, application parameters, and device(s) for different musculoskeletal conditions. The published literature on RM seems limited to small sample sizes and short-term assessments.<sup>3-5</sup>

Future survey research with larger sample sizes and actual patients is needed before correlations or interpretations are made regarding trends in the use of RM devices among sports and orthopedic PT professionals. Future studies should attempt

to correlate such trends with the type of physical therapy setting, professionals' work experience, and client demographics.

## CONCLUSION

This descriptive survey explored and documented responses in the use of RM among PT professionals. The results of this study should be considered a starting point for future surveys and correlational research. There is a gap between the RM research and professional practice, and it is important to develop scientific guidelines for prescribing the most effective RM interventions for clients.

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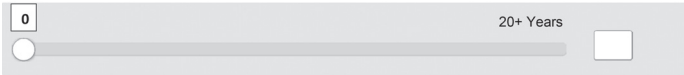


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## APPENDIX A

### Survey Questions

- 1) Please indicate if you give consent to participate in this survey
  - I consent to participate in this survey
  - I do not consent
- 2) Please describe your gender.
  - Male
  - Female
  - Prefer not to answer
- 3) Please choose all your credentials.
  - Physical Therapist (PT)
  - Chiropractor (DC)
  - Certified Athletic Trainer (ATC)
  - Occupational Therapist (OT)
  - Fitness Professional (Certified Personal Trainer)
  - Medical Doctor, Podiatrist, Doctor of Osteopathy
  - Other certifications or degrees
- 4) Which roller massage (RM) or self-myofascial release (SMR) devices do you use most often in your practice? Please rank them.
  - Foam roller
  - Roller massage stick
  - Massage ball
  - Other devices
- 5) What type of devices do you recommend to your clients (or patients)? Choose \* all that apply.
  - Foam roller
  - Roller massage stick
  - Massage ball
  - None
  - Other devices
- 6) Please choose your primary practice setting/s.
  - Outpatient clinic
  - Hospital based clinic
  - University sports medicine clinic or athletic training facility
  - High school athletic training facility
  - Fitness or wellness facility
  - Other setting (e.g. home, outdoors)
- 7) How many years have you been in professional practice  

- 8) How often do you prescribe RM (SMR) to your clients? Please rank them (e.g. most to least)
  - Daily
  - Weekly
  - Monthly
- 9) Where do you direct your clients to purchase devices? Choose all that apply.
  - Manufacturer website (e.g. TriggerPoint, Hyperice, OTP)
  - Generic websites (e.g. Amazon)
  - Store (brick and mortar)
  - Resell in my clinic or business
  - Other (please specify)
- 10) What length of foam roller do you most commonly use and recommend to your clients?
  - Half size (e.g. 13-15 inches)
  - Full size (e.g. 26-36 inches)
  - Both sizes
  - I don't recommend
- 11) What type of roller density do you believe has the greatest effect on the myofascial system?
  - Hard density (rigid) rollers
  - Moderate density rollers
  - Soft density rollers
  - Other types of roller densities
- 12) Do you progress your clients through the different roller densities (e.g. soft to hard)?
  - Always
  - Sometimes
  - Never
- 13) What are the reasons you choose RM (SMR) for your clients? Please rank them.
  - Performance enhancement
  - Injury prevention

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- Treatment of injury
  - Pre-exercise warm-up and post-exercise treatment
- 14) What is the common time range you prescribe for a pre or post-exercise session per muscle group?
- 30 seconds or less
  - 30 seconds to 1 minute
  - 1 minute to 2 minutes
  - 2 minutes to 3 minutes
  - No, I do not prescribe
- 15) What is the total time you commonly prescribe for a pre or post-exercise session?
- 3 to 5 minutes
  - 5 to 10 minutes
  - 10 to 15 minutes
  - 15 to 20 minutes
  - No, I do not prescribe
- 16) What is the average cadence (speed) you recommend when using a device?
- 1 to 2 seconds along the muscle (up and down)
  - 2 to 5 seconds along the muscle (up and down)
  - self-paced cadence
  - no cadence taught
  - Other techniques
- 17) What are the common modes of education you use to teach RM (SMR)? Please rank them.
- Live instruction
  - Video instruction
  - Self-guided program
  - Education materials (e.g. handouts with exercises)
- 18) What type of immediate and lasting (> 2 weeks) changes have you seen? Choose all that apply.
- Increased joint ROM
  - Increased mobility
  - Decreased pain
  - No changes seen
- 19) What clinical measures do you use to assess the effects? Choose all that apply
- Joint range of motion (e.g. goniometer, inclinometer)
  - Pressure pain threshold (e.g. algometer)
  - Patient reported outcomes (e.g. NRS, VAS pain scales)
  - Movement based testing (e.g. FMS, SFMA)
  - No, I do not evaluate
- 20) There is a lot of emerging research on RM. Do you believe there are still gaps in what we know?
- Yes
  - No
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